

The Sacramento Bee

Scientists: Trees help, not hinder, levee safety

U.S. Army Corps of Engineers hears challenges to its removal policy at Sacramento hearing.

By Matt Weiser - Bee Staff Writer

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Though federal officials on Tuesday faced a deluge of evidence that trees do not threaten levees, they continued to tout their own policy that could require every mature tree to be cut down on Sacramento levees.

At a symposium on the issue in Sacramento, a parade of scientists summarized decades of research showing that trees may, in fact, improve flood safety when planted on levees.

The backdrop to Tuesday's meeting were the 32 Central Valley levee districts that in February failed a maintenance inspection by the U.S. Army Corps of Engineers. Most failed because their levees had too many trees and shrubs.

The corps, which is preparing a new national levee maintenance policy, currently says no vegetation larger than 2 inches in diameter should grow on a levee. But that standard has not been applied in California. In fact, the local district of the corps has worked for decades with local, state and federal agencies to plant more trees on levees.

The issue affects levee managers nationwide, but it is especially critical in California, where levees provide virtually the only remaining riverside wildlife habitat.

"By and large ... trees have a positive or beneficial influence on the safety of levees," Donald Gray, a geotechnical engineering professor at the University of Michigan, told the symposium.

The findings were included in a 1991 paper he co-wrote based on a study sponsored by the corps. "This report was vetted by all the corps districts before its publication," Gray said.

However, David Pezza, engineering and construction chief of the corps' civil works branch, said officials did not consider the study in their maintenance policies because "it didn't match what they saw in the field."

"We do a lot of research in support of our civil works program. But in that particular case, we did not find that science was relevant to what we were

Levees with trees

Many local flood control districts have failed federal inspections partly because they have trees on their levees. A U.S. Army Corps of Engineers maintenance standard is being applied in California for the first time.



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doing," Pezza said. "Vegetation is very hazardous to infrastructure when it's not done in an integrated way."

Much of the corps' policy is based on a Federal Emergency Management Agency document called "FEMA 534 Technical Manual for Dam Owners," which explains threats to earthen dams from trees and other vegetation.

"When trees grow, they tend to corkscrew their way into an embankment and that tends to loosen the soil," said Bill Bouley of the U.S. Bureau of Reclamation, co-author of the FEMA document. "Tree roots do not stabilize soil mass. On the contrary, tree root penetration loosens the soil."

Other scientists at Tuesday's symposium contradicted that.

Douglas Shields, a hydraulic engineer at a U.S. Department of Agriculture lab in Mississippi, has studied levees on the Sacramento River and elsewhere. He said tree roots improve the shear strength -- the point at which soil yields under stress -- of the soil they grow in.

"You see a major increase in factor of safety as we move from a minimal root area ratio to a higher level," he said. "We concluded that maintenance standards should favor shrubs and woody trees."

This year, he and several colleagues used a computer model to show that trees also offer more erosion protection than a uniform carpet of grass, the levee cover favored by the corps.

More than 500 people from as far away as Holland are attending the symposium, organized by the Sacramento Area Flood Control Agency and the Corps of Engineers. It continues today at the Sacramento Convention Center on J Street. Some asked what the consequences would be to flood safety if trees were clearcut from levees, leaving their roots behind.

UC Davis horticulture professor Alison Berry said this could destabilize levees by causing a large and disparate root mass to decay in unison. Levee erosion also might increase.

Dirk Van Vuren, a UC Davis professor of wildlife biology, said removing trees could create better conditions for animals that are most troublesome for levee managers: burrowing rodents.

Gophers, ground squirrels and voles are the most prolific burrowing mammals on area levees, Van Vuren said. But they actually prefer open landscapes to easily detect predators. So a tree-clearing program on levees, he said, is likely to improve their habitat and cause their numbers to grow.

Joe O'Connor, who lives along the American River Parkway, said he is grateful the corps is willing to listen to science on the issue. He just hopes engineers use it to guide policy.

O'Connor fought to preserve three heritage oak trees during design of a new levee in his Butterfield-Riviera East neighborhood. He lost that battle last year to the corps, which insisted on a standard levee design that required the trees to be cut down.

"Safety is No. 1, always," O'Connor said. But, he said, "There's no need to damage the parkway if it's not going to produce a beneficial effect."

About the writer:

The Bee's Matt Weiser can be reached at (916) 321-1264 or mweiser@sacbee.com.